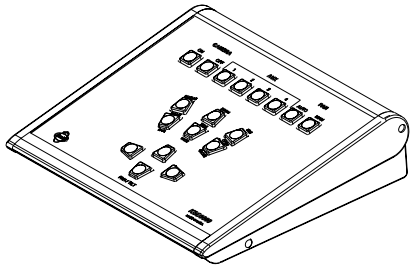

KBD9000 Transmitter/ Controller

Installation/ Operation Manual

C551M (4/98)

Pelco • 3500 Pelco Way, Clovis • CA 93612-5699 USA • www.pelco.com
In North America and Canada: Tel (800) 289-9100 or FAX (800) 289-9150
International Customers: Tel (1-559) 292-1981 or FAX (1-559) 348-1120

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REVISION HISTORY

Manual #	Date	Comments
C551M	1/98	Original version.
	4/98	Added Certifications. Deleted Figure 4.

1.0 GENERAL

1.1 IMPORTANT SAFEGUARDS AND WARNINGS

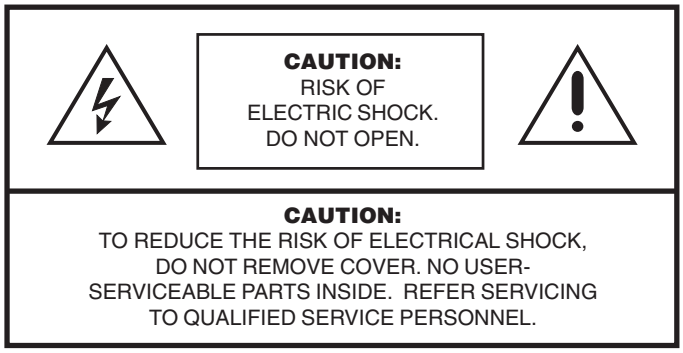
Prior to installation and use of this product, the following WARNINGS should be observed.

1. Installation and servicing should only be done by Qualified Service Personnel and conform to all Local codes.
2. Unless the unit is specifically marked as a NEMA Type 3, 3R, 3S, 4, 4X, 6, or 6P enclosure, it is designed for indoor use only and it must not be installed where exposed to rain and moisture.
3. Only use replacement parts recommended by Pelco.

The product and/or manual may bear the following marks:

This symbol indicates that dangerous voltage constituting a risk of electric shock is present within this unit.

This symbol indicates that there are important operating and maintenance instructions in the literature accompanying this unit.



Please thoroughly familiarize yourself with the information in this manual prior to installation and operation.

1.2 REGULATORY NOTICES

NOTE: This equipment has been tested and found to comply with the limits of a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However there is no guarantee that the interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

1.3 UNPACKING INSTRUCTIONS

Unpack and inspect all parts carefully.

The following items are supplied:

1	KBD9000 Transmitter/Controller
1	Installation/Operation Manual (C551M)
1	12 VAC Wall Mount Transformer

Be sure to save the shipping carton, boxes and inserts. They are the safest material in which to make future shipments.

If an item appears to have been damaged in shipment, replace it properly in its box and contact the factory at 1-800-289-9100 or 1-559-292-1981 for a replacement. (International customers fax 1-559-348-1120 for authorization and instructions.)

If an item needs to be returned to the factory for repair, consult the WARRANTY AND RETURN section of this manual for instructions.

2.0 DESCRIPTION

The KBD9000 Transmitter/Controller is a desk top unit that provides up to 16 remote control functions. It operates without the need for control cables other than for a dedicated video cable for the normal transmission of a remote camera signal to the local monitoring and control position. Coaxitron® control lends itself to applications where short-to-medium distances are involved and where equalization of cable losses is not required.

Check your receiver/driver manual for active functions.

Typically, control functions are:

1. Pan Left
2. Pan Right
3. Tilt Up
4. Tilt Down
5. Zoom In
6. Zoom Out
7. Focus Near
8. Focus Far
9. Iris Open
10. Iris Close
11. Camera Power On/Off
12. Auto/Manual Scan
13. AUX 1
14. AUX 2
15. AUX 3
16. AUX 4

Functions 1 through 10, 15 and 16 are momentary; that is, they are only actuated while the associated control switch on the KBD9000 is operated. Functions 11, 12, 13 and 14 are latching; that is, camera power, auto scan, and auto/ manual iris are latching functions and remain on until turned off. The latching iris function is not dedicated, and with proper interfacing, it can be used for some other latching function. Alternately, AUX 1, 2, 3 and 4 may be used as momentary functions to control such things as lights or gates with proper external interfacing. Up to ten functions can be operated simultaneously. Functions 11 through 16 must be used individually; although any one of these functions may be used simultaneously with functions 1 through 10.

KBD9000 is an improved version of the original Coaxitron® transmitter/controller. Improvements include the following features:

1. When used with a Pelco CX900TLC Test Local Control Plug-in Module, provides troubleshooting capability for both the receiver and the KBD9000.

2. Pan/tilt, zoom, and camera power control are included on the main receiver board, which eliminates malfunctions due to incorrect wiring or broken wires.

KBD9000 provides the following standard functions:

1. Pan/Tilt
2. Lens Control — Zoom, iris, and focus
3. Camera power (on/off)

The KBD9000 does not have preset capabilities, but it will work with receivers capable of doing presets.

2.1 MODELS

KBD9000	Desktop Coaxitron® transmitter/controller with pan & tilt and zoom lens control. 120 VAC input.
KBD9000-X	Same as the KBD9000 except 230 VAC input. (CE)

2.2 CERTIFICATIONS

The products identified below have been tested and certified for agency compliance
as noted.

	Agency Compliance Certification			
Model	**CE**	**FCC**	**UL**	**CSA/cUL**
KBD9000		X		
KBD9000-X	X			

Applicable CE, FCC, UL, and CSA/cUL directives/standards:

- 93/68/EEC–CE Mark Directive
  - 89/336/EEC, 92/31/EEC–Electromagnetic Compatibility (EMC) Directives
    - EN 55022: 1984 Class B–Radio-frequency emissions limits
    - EN 55082-2: 1992–Immunity standard
      - IEC 801-2: 1984–ESD immunity
      - IEC 801-3: 1984–Radiated field immunity
      - IEC 801-4: 1988–Electrical Transients
- 73/23/EEC–Low Voltage Directive (EMC)
  - EN 60950– Safety of ITE Equipment
- FCC–47 CFR, Part 15, Subpart B, Class B

Additional applicable standards:

- NEMA Type 1
- IP 30

3.0 INSTALLATION

3.1 POWER

No power on/off switch is provided. To apply power: insert the wall mount transformer plug into the 12 VAC power jack in the rear panel and insert the wall mount transformer into a 120 VAC power source (230 VAC with KBD9000-X).

3.2 VIDEO INPUT

NOTE: *Refer to Table A for the type of video coaxial cable to use.*

Connect a good grade of video coaxial cable from the Coaxitron® receiver or manual video switcher to the video "IN" BNC connector on the rear panel of the KBD9000.

Table A. Video Coaxial Cable Requirements

Cable Type*	Maximum Distance
RG59/U	750 ft (229 m)
RG6/U	1,000 ft (305 m)
RG11/U	1,500 ft (457 m)

* Minimum cable requirements:
- 75 ohms impedance
- All-copper center conductor
- All-copper braided shield with 95% braid coverage

3.3 VIDEO OUTPUT

Connect a good grade of video coaxial cable from the video "OUT" BNC connector on the rear panel of the KBD9000 to the video input of the monitor. This cable should be terminated in 75 ohms at the monitor, or if looped through the monitor, terminated at the far end of the run.

3.4 SYSTEM CONFIGURATIONS

The simplest system configuration utilizing the KBD9000 is shown in Figure 1. Basic KBD9000 Configuration. This system consists of the KBD9000 control transmitter, coax cable and receiver/camera. This basic Coaxitron® system is flexible and can be expanded to control multiple camera sites when a hard contact switching device is added. In this configuration, the Hi-Z/75-ohm switch on the back of the KBD9000 is set to the 75-ohm position.

The addition of a manual video switcher and one receiver/camera is shown in Figure 2. KBD9000 with Manual Video Switcher and Multiple Cameras. In this example, the active coaxial cable is terminated in the KBD9000 and the inactive cables are terminated in the switcher. The selected camera signal is fed to the KBD9000, which then feeds the monitor. When a camera selection is made, that video line is dedicated to the KBD9000 and allows the associated Coaxitron® receiver to be controlled. Functions such as auto/random are latching and will remain on until turned off by the KBD9000. In this configuration, the Hi-Z/75-ohm switch on the back of the KBD9000 is set to the 75-ohm position.

KBD9000 basic interconnections between the KBD9000 and receiver are shown in Figure 3. If you have chosen a configuration that includes a switching device, refer to the manual provided with the switcher for the appropriate connections.

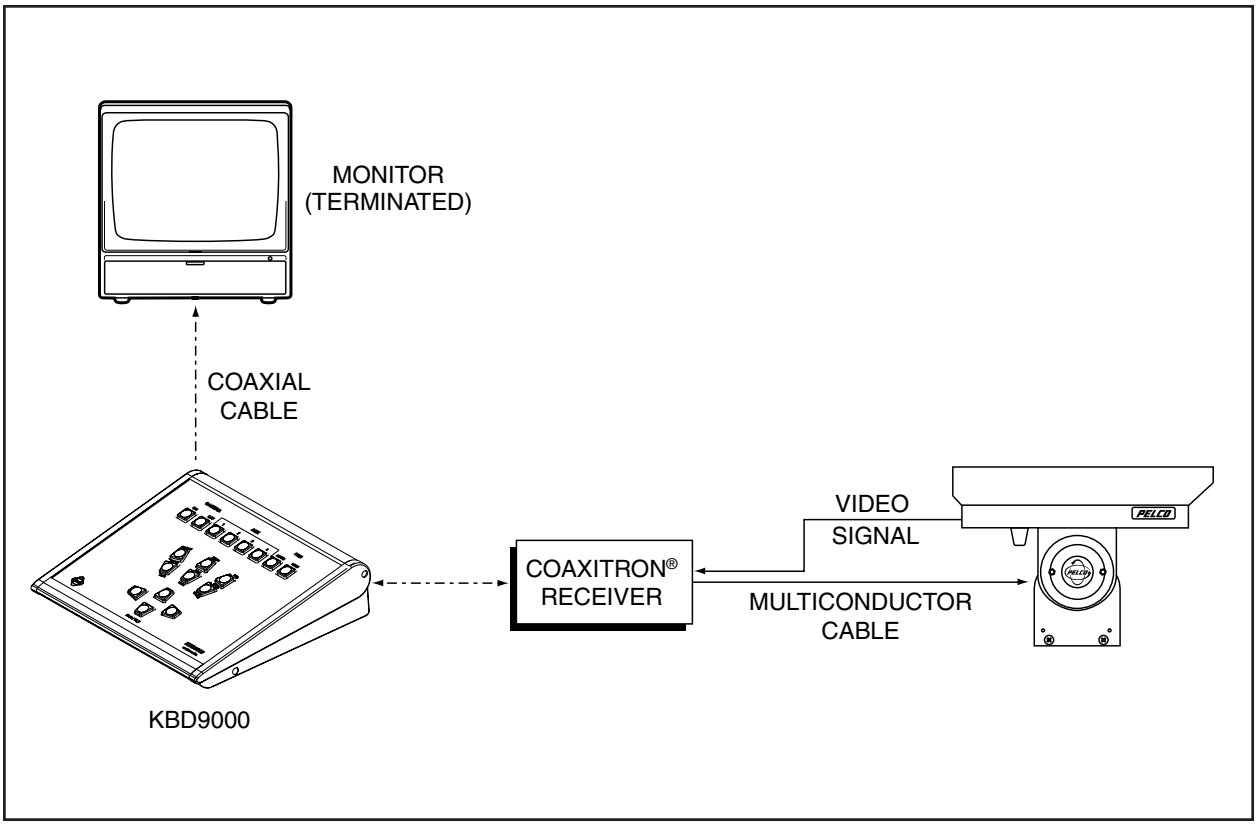


Figure 1. Basic KBD9000 Configuration

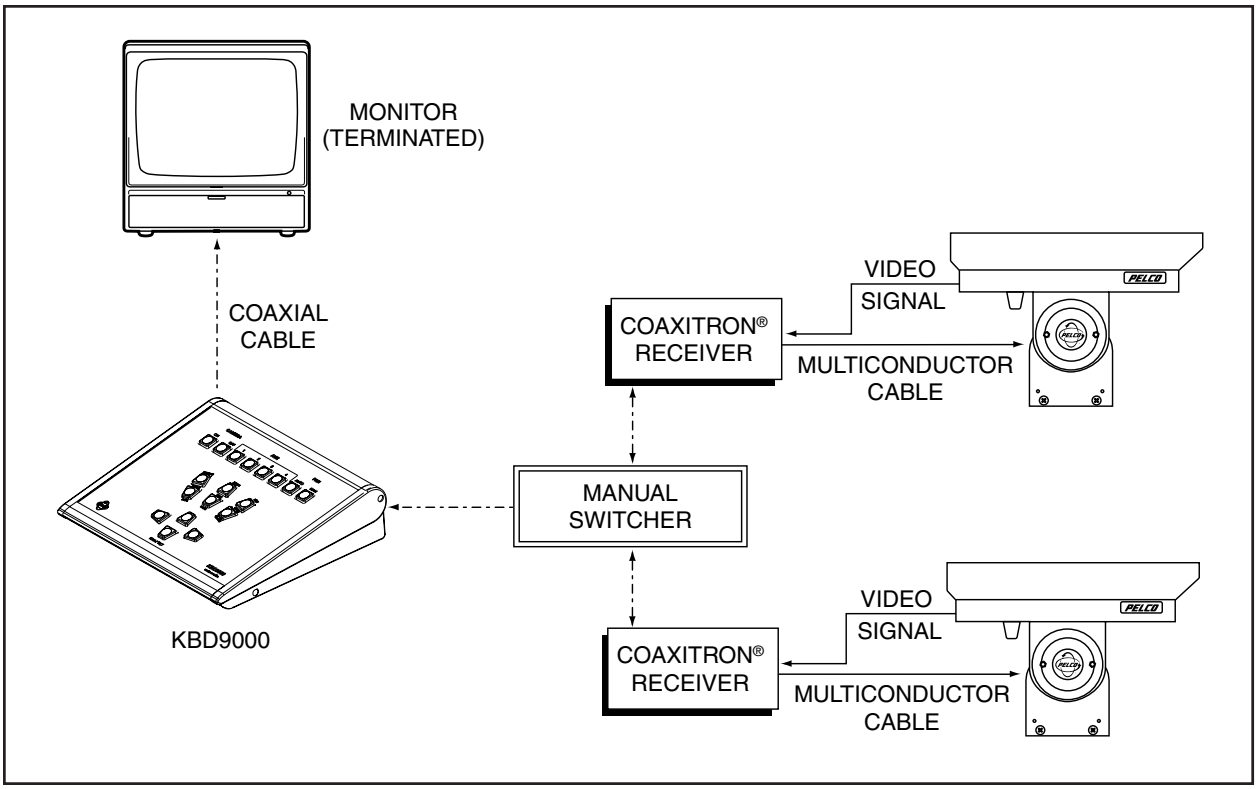


Figure 2. KBD9000 Configuration with Manual Video Switcher and Multiple Cameras

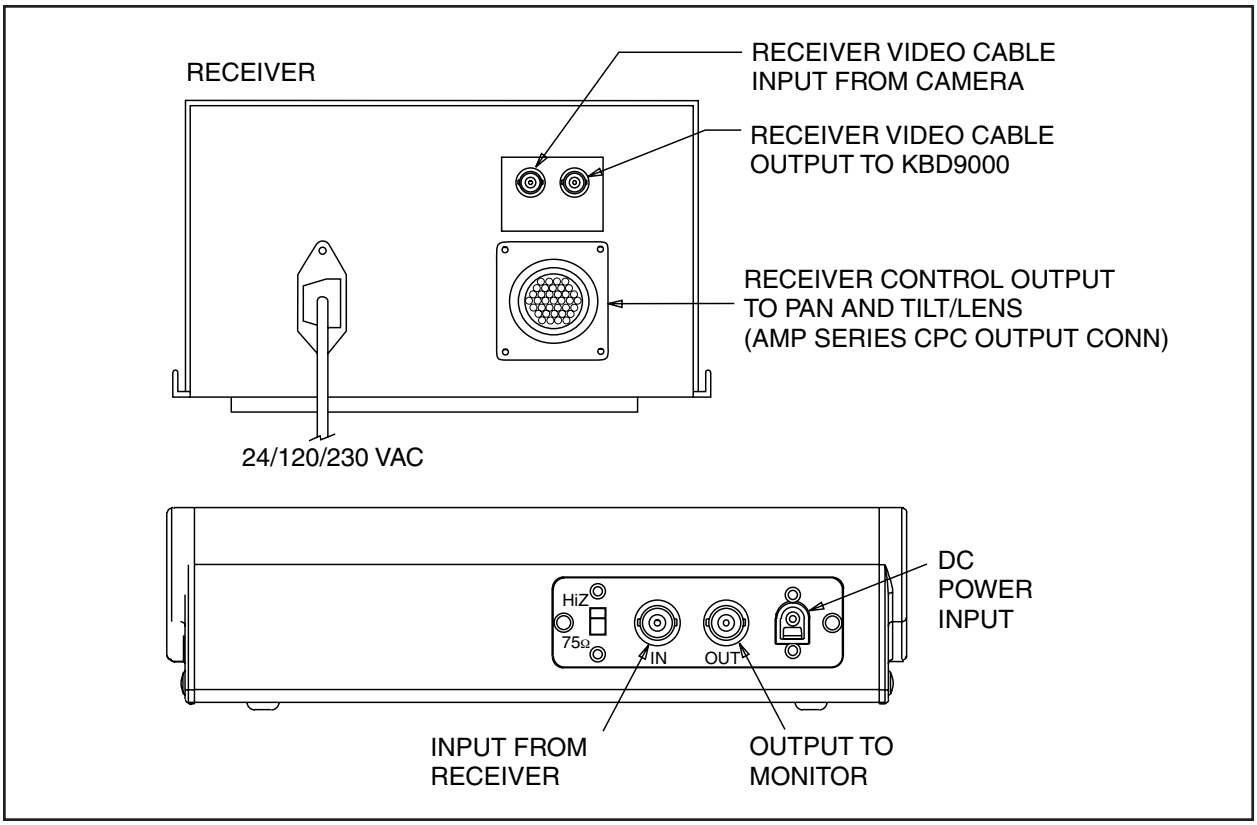


Figure 3. Basic KBD9000 Configuration Interconnect Diagram

NOTE: *All but the last KBD9000 transmitter and associate switcher must be looping and unterminated. Transmitters and associated switchers should be physically adjacent to prevent signal deterioration due to cable mismatch.*

The Figure 4 drawing, KBD9000 Configuration with Multiple Transmitter and Receivers, shows a more complex system. In this example, multiple KBD9000 transmitters are controlling multiple receivers.

Video cables from the receivers are looped through the first control station to the second. At the first control station, a bridging-looping type sequential switcher is used and the Hi-Z/75-ohm switch on the back of the KBD9000 is set to the Hi-Z position. At the second control station, a terminating switcher is used and the Hi-Z/75-ohm switch on the back of the KBD9000 is set to the 75-ohm position.

Any one KBD9000 transmitter can assume control. If two or more KBD9000 control units are activated simultaneously, erroneous responses are prevented by error detection circuitry in the associated receiver.

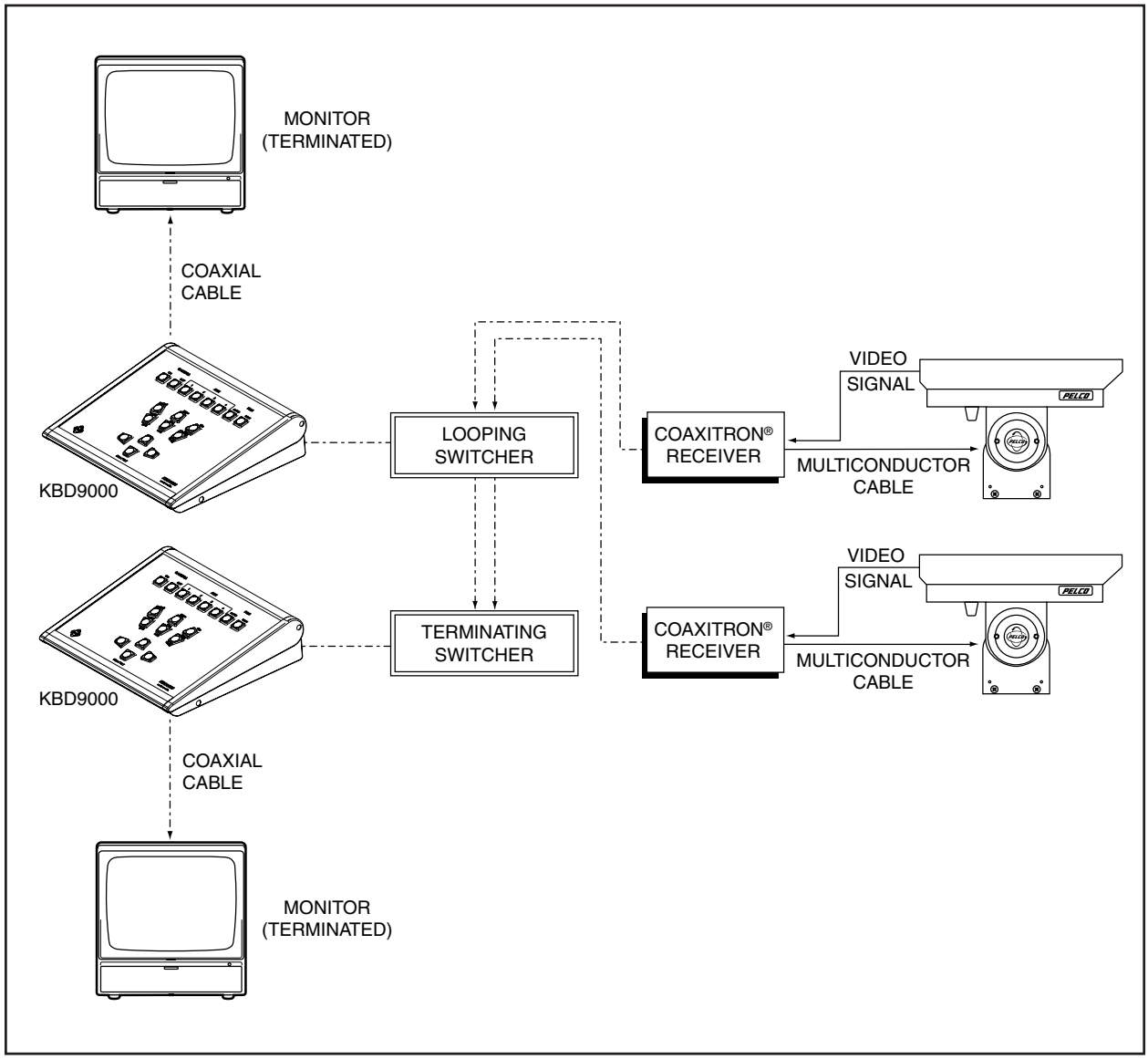


Figure 4. KBD9000 Configuration with Multiple Transmitters and Receivers

In general, all operating controls on the KBD9000 are self-explanatory. See Section 4.2, KBD9000 CONTROLS, for more information about each control function.

4.1 FUNCTIONAL CIRCUIT DESCRIPTION

The basic functional concept of a Coaxitron® system feeds 15 control pulses in a reverse direction from the KBD9000 control transmitter to the receiver located near each camera station. These control pulses do not interfere with the video monitor presentation because they occur during the vertical blanking interval of the video signal.

Coaxial cable impedance matching is assured by the video amplifier in the control receiver. Proper receiving and termination impedance is likewise assured by the terminating resistor in the KBD9000 control transmitter. Any equipment placed between the remote and local locations must be of the “loop-through” or “bridging” type; line amplifiers cannot be tolerated.

Response time of the system is normally less than 30 ms. Error detection circuitry is incorporated to immunize the system from externally generated noise. Under extremely adverse environmental noise conditions response time may increase and control functions can fail. Under such extreme conditions, however, provision is made to inhibit all momentary functions.

The proper function of the Coaxitron® system depends on the compatibility of two signals simultaneously traveling in opposite directions in the same coaxial cable. If the control signal is made large, compared to the video signal, there is the risk that associated equipment will be adversely affected. If the control signal is made small, compared to the video signal, it becomes difficult to separate it from the video signal (and any incumbent noise or hum). Therefore, the Coaxitron® system is designed to function with video and control signals nominally equal.

Under such circumstances, reliable performance can be predicted with cable lengths up to 1,500 feet (457 m). Beyond this distance, the control signal amplitude can become attenuated sufficiently to make performance marginal. Marginal performance is also approached if the video signal is allowed to become excessive — the dynamic range of the receiver video amplifier is one limitation. Sending end distortion, produced by the coaxial cable, is typically the major contributor to the malfunctioning of a Coaxitron® system. The amplitude of distortion products is proportional to video signal amplitude and is a nonlinear function of cable length. The influence of these distortion products upon system performance is difficult to predict if signal amplitude is allowed to exceed specifications.

Normally, auto-iris functions will maintain a video level well within reasonable limits and assure reliable performance. Often, however, automatic or manual level settings may be made abnormally high (perhaps to compensate for long cable losses or to produce a picture with more contrast). An excessively high video level setting can cause the Coaxitron® control system to fail completely — with all control functions disabled. In order to prevent system failures due to excessively high video levels, it is recommended that cameras be powered by the receiver.

The KBD9000 is designed to combat prolonged loss of control due to the conditions described previously by providing the following protective functions:

1. Simultaneous commands from two different sources are processed to assure that manual iris control cannot be inadvertently selected in place of automatic control.

2. A sustained (20 to 40 second) illegal command condition results in (a) camera off, (b) automatic iris, or (c) manual pan.

These functions greatly reduce the possibility of loss of control and usually eliminate the need for service.

As an example, assume that the operator switches to manual iris control and proceeds to open the iris excessively. The result can be a complete loss of control. Within 20 to 40 seconds, camera power is automatically removed (assuming this feature exists) and auto iris is reinstated.

4.2 KBD9000 CONTROLS

Refer to Figure 5. KBD900 Control Buttons to better understand the KBD9000 controls.

The KBD9000 has the following controls:

Camera Power	Two push-button switches for On/Off control (latching function)
Aux 1,2	Two push-button switches for latching functions
Aux 3, 4	Two push-button switches for momentary functions*
Pan	Two push-button switches for Auto/Man pan control (latching function)*
Focus	Two push-button switches for Near/Far focus control.
Zoom	Two push-button switches for Tele/Wide zoom control.
Iris	Two push-button switches for Open/Close iris control.
Pan/Tilt	Four push-button switches for Pan/Tilt control.

*External requirements are needed for operation (refer to receiver manual).

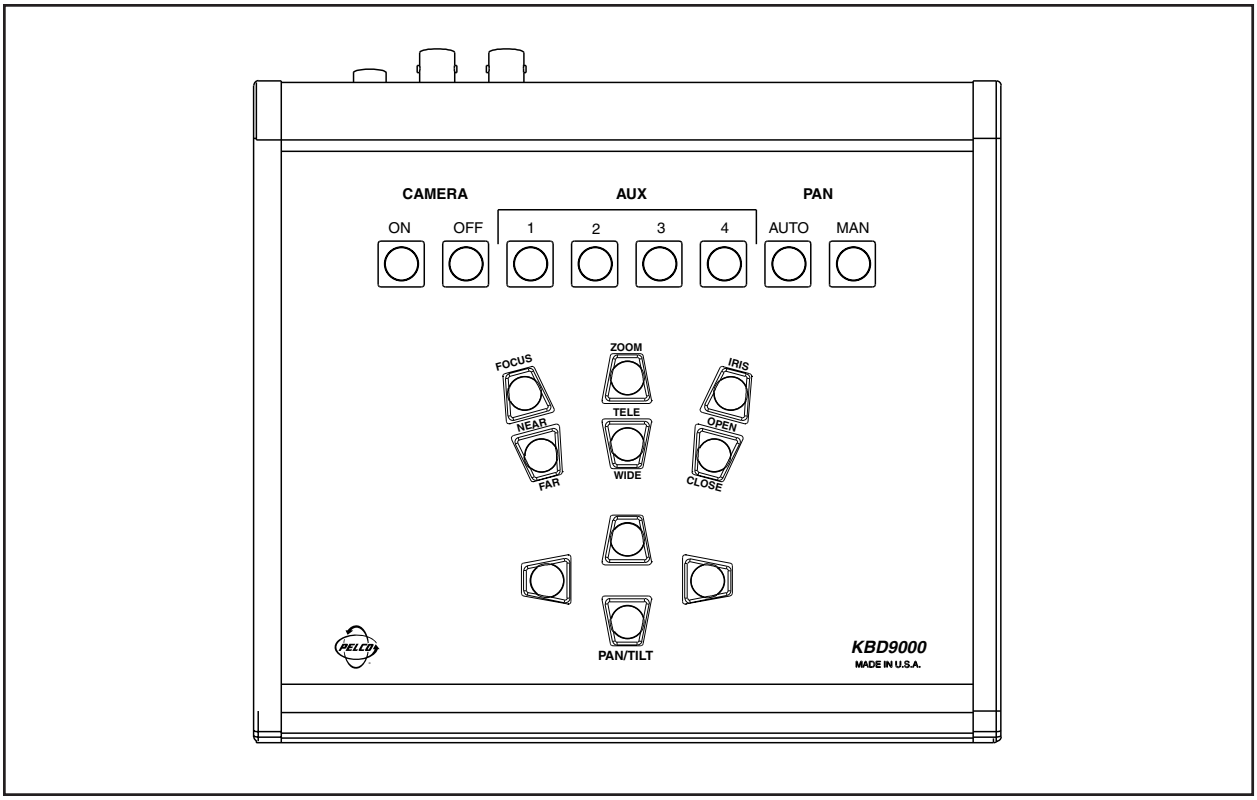


Figure 5. KBD9000 Control Buttons

5.0 TROUBLESHOOTING

If you experience operating problems with either the receiver or the KBD9000, first check all receiver fuses and voltage readings to make sure they are in working order. The Pelco CX900TLC Local Test Board Plug-in Module can be utilized to verify that receiver functions and accessories are operational.

There is little that can be done without the aid of an oscilloscope. We recommend you contact your local dealer or our Customer Service Department for assistance.

6.0 MAINTENANCE

The KBD9000 is engineered to provide years of reliable service. Regularly scheduled maintenance is not required. Clean the outer surface of the KBD9000 with a nonabrasive cleaning cloth and antistatic cleaner. Be sure not to get any cleaner inside the KBD9000 case.

7.0 SPECIFICATIONS

ELECTRICAL

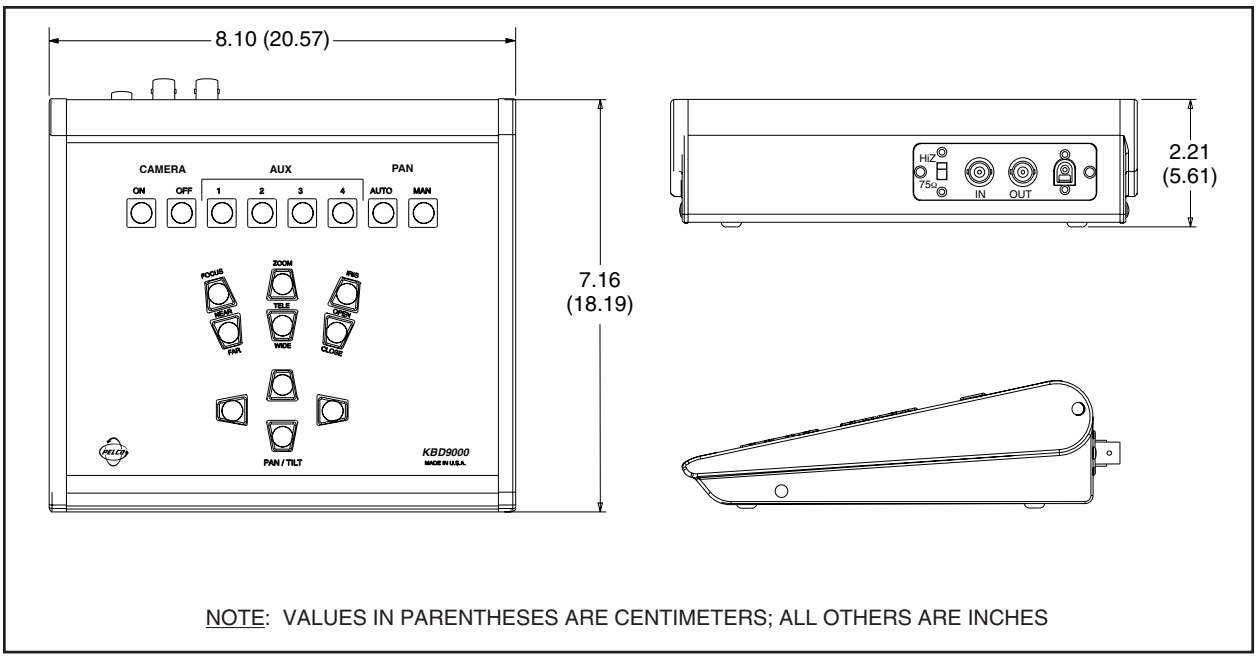
Input Voltage:	12 VAC from a 120 VAC, 60 Hz wall transformer provided with unit (230 VAC, 50 Hz with KBD9000-X)
Power Consumption:	2.5 vA
Connectors:	Two video BNC connectors (video input and output)
Input Impedance:	75 ohms or high impedance (Hi Z), switchable
Control Method:	15-pulse train (pulse width modulated) superimposed on the video signal during the vertical blanking interval by the KBD9000 control transmitter. Pulse train occupies 1 TV line period.
Pulse Amplitude:	Approximately 1 Vp-p added to video signal, 333 kHz nominal
Input Video Level:	1 Vp-p nominal; 2 Vp-p maximum at less than 75% APL; 1.5 Vp-p maximum at 90% APL
System Bandwidth:	Less than 2 dB down at 10 MHz (exclusive of cable)

GENERAL

Construction:	Aluminum
Finish:	Gray polyester powder coat
Environment:	Indoor; -10° to 120°F (-23° to 49°C)
Dimensions:	See Figure 6.
Weight:	Unit: 1.95 lb (0.90 kg); Shipping: 5.0 lb (2.27 kg) approximate
Rating:	NEMA 1

(Design and product specifications subject to change without notice.)

This equipment contains electrical or electronic components that must be recycled properly to comply with Directive 2002/96/EC of the European Union regarding the disposal of waste electrical and electronic equipment (WEEE). Contact your local dealer for procedures for recycling this equipment.



NOTE: VALUES IN PARENTHESES ARE CENTIMETERS; ALL OTHERS ARE INCHES

Figure 6. KBD9000 Dimension Drawing

8.0 WARRANTY AND RETURN INFORMATION

WARRANTY

Pelco will repair or replace, without charge, any merchandise proved defective in material or workmanship for a period of one year after the date of shipment.

Exceptions to this warranty are as noted below:

- Five years on FT/FR8000 Series fiber optic products.
- Three years on Genex® Series products (multiplexers, server, and keyboard).
- Three years on Camclosure® and fixed camera models, except the CC3701H-2, CC3701H-2X, CC3751H-2, CC3651H-2X, MC3651H-2, and MC3651H-2X camera models, which have a five-year warranty.
- Two years on standard motorized or fixed focal length lenses.
- Two years on Legacy®, CM6700/CM6800/CM9700 Series matrix, and DF5/DF8 Series fixed dome products.
- Two years on Spectra®, Esprit®, ExSite™, and PS20 scanners, including when used in continuous motion applications.
- Two years on Esprit® and WW5700 Series window wiper (excluding wiper blades).
- Eighteen months on DX Series digital video recorders, NVR300 Series network video recorders, and Endura™ Series distributed network-based video products.
- One year (except video heads) on video cassette recorders (VCRs). Video heads will be covered for a period of six months.
- Six months on all pan and tilts, scanners or preset lenses used in continuous motion applications (that is, preset scan, tour and auto scan modes).

Pelco will warrant all replacement parts and repairs for 90 days from the date of Pelco shipment. All goods requiring warranty repair shall be sent freight prepaid to Pelco, Clovis, California. Repairs made necessary by reason of misuse, alteration, normal wear, or accident are not covered under this warranty.

Pelco assumes no risk and shall be subject to no liability for damages or loss resulting from the specific use or application made of the Products. Pelco's liability for any claim, whether based on breach of contract, negligence, infringement of any rights of any party or product liability, relating to the Products shall not exceed the price paid by the Dealer to Pelco for such Products. In no event will Pelco be liable for any special, incidental or consequential damages (including loss of use, loss of profit and claims of third parties) however caused, whether by the negligence of Pelco or otherwise.

The above warranty provides the Dealer with specific legal rights. The Dealer may also have additional rights, which are subject to variation from state to state.

If a warranty repair is required, the Dealer must contact Pelco at (800) 289-9100 or (559) 292-1981 to obtain a Repair Authorization number (RA), and provide the following information:

1. Model and serial number
2. Date of shipment, P.O. number, Sales Order number, or Pelco invoice number
3. Details of the defect or problem

If there is a dispute regarding the warranty of a product which does not fall under the warranty conditions stated above, please include a written explanation with the product when returned.

Method of return shipment shall be the same or equal to the method by which the item was received by Pelco.

RETURNS

In order to expedite parts returned to the factory for repair or credit, please call the factory at (800) 289-9100 or (559) 292-1981 to obtain an authorization number (CA number if returned for credit, and RA number if returned for repair).

All merchandise returned for credit may be subject to a 20% restocking and refurbishing charge.

Goods returned for repair or credit should be clearly identified with the assigned CA or RA number and freight should be prepaid. Ship to the appropriate address below.

If you are located within the continental U.S., Alaska, Hawaii or Puerto Rico, send goods to:

Service Department
Pelco
3500 Pelco Way
Clovis, CA 93612-5699

If you are located outside the continental U.S., Alaska, Hawaii or Puerto Rico and are instructed to return goods to the USA, you may do one of the following:

If the goods are to be sent by a COURIER SERVICE, send the goods to:

Pelco
3500 Pelco Way
Clovis, CA 93612-5699 USA

If the goods are to be sent by a FREIGHT FORWARDER, send the goods to:

Pelco c/o Expeditors
473 Eccles Avenue
South San Francisco, CA 94080 USA
Phone: 650-737-1700
Fax: 650-737-0933

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